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IS 15099 (2002): Textiles - Method for determination of colour fastness - Multifibre Adjacent Fabric [TXD 5: Chemical Methods of Test]

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वस्त्रादि — बहुरेशीय एडजैसेन्ट वस्त्र — विशिष्टि

Indian Standard

TEXTILES — MULTIFIBRE ADJACENT FABRIC — SPECIFICATION

ICS 59.080.01

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BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

June 2002

Price Group 6

Chemical Methods of Test Sectional Committee, TX 05

FOREWORD

This Indian Standard was adopted by the Bureau of Indian Standards, after the draft finalized by the Chemical Methods of Test Sectional Committee had been approved by the Textile Division Council.

This standard is technically equivalent to ISO 105-F10 : 1989 'Textiles — Tests for colour fastness Part F 10 Specification for adjacent fabric: Multifibre' issued by the International Organization for Standardization.

The composition of the Committee responsible for formulation of this standard is given in Annex E.

In reporting the result of a test or analysis made in accordance with this standard, if the final value, observed or calculated, is to be rounded off, it shall be done in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'.

Indian Standard

TEXTILES — MULTIFIBRE ADJACENT FABRIC — SPECIFICATION

1 SCOPE

This standard prescribes requirements for undyed multifibre adjacent fabrics used for assessment of staining in colour fastness requirement of textiles. The multifibre adjacent fabrics exhibit standardized staining properties.

2 REFERENCES

The following standards contain provisions which, through reference in this text, constitutes provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below:

IS No.	*Title*
768 : 1982	Method for evaluating change in colour (*first revision*)
769 : 1982	Method for evaluating staining (*first revision*)
832 : 1985	Methods for determination of twist in yarn (*first revision*)
1315 : 1977	Method for determination of linear density of yarn spun on cotton system (*first revision*)
1390 : 1983	Methods for determination of *p*H value of aqueous extracts of textile materials
1963 : 1981	Methods for determination of threads per unit length in woven fabrics (*second revision*)
1964 : 1970	Method for determination of weight per square meter and weight per linear metre of fabric (*first revision*)
3361 : 1979	Method for determination of colour fastness of textile materials to washing: Test 2 (*first revision*)
3429 : 1966	Method of determination of solubility of wool in alkali
4390 : 1967	Method for determination of either soluble matter in textile materials
10014	Methods of test for man-made staple fibres
(Part 1) : 1984	Determination of length
(Part 2) : 1981	Determination of linear density
10251 : 1982	General principles of testing textiles for colour fastness tests
15098 : 2001	Textiles — Method for calculation of colour difference

3 TYPES

The multifibre adjacent fabrics shall be of two types as described in Table 1.

Table 1 Multifibre Adjacent Fabrics

Multifibre DW (1)	Multifibre TV (2)
Secondry acetate	Triacetate
Bleached cotton	Bleached cotton
Polyamide	Polyamide
Polyester	Polyester
Acrylic	Acrylic
Wool	Viscose

Some colour fastness tests cannot be performed in the presence of wool and/or secondry acetate in which case type TV multifiber adjacent fabric shall be used in place of type DW.

NOTES

1 Fabrics of other constructions but having the same width of strip and exhibiting the same staining characteristics as the multifibre fabric described in the standard may also be used and reported in the test report.

2 Since there may be difference in test results when multifibre adjacent fabrics are used instead of single fibre adjacent fabrics, the type of adjacent fabrics used and same shall be reported in the test report.

4 GENERAL REQUIREMENTS

4.1 Each component of multifibre adjacent fabric shall be made from fibres having staining properties similar to those used in corresponding single fibre adjacent fabrics specified in Annex A. The staining characteristics of multifibre adjacent fabrics shall be determined using the method given in Annex B.

4.2 Materials for the Warp Yarn

Warp yarn shall be spun from bright filament polyester (not containing optical brightner) and shall have designation of 15.5 tex/27 filament/R02 400 turns/m Z twist where *R* is resultant linear density.

4.3 Materials for Weft Yarn

Properties of materials used as weft yarn in weaving the multifibre adjacent fabric are given in Table 2.

4.4 Fabric Construction

4.4.1 The number of threads per inch when determined as per IS 1963 shall be 90 and 75(average) in warp and weft direction respectively.

4.4.2 The weave of the woven fabric shall be 6/6 in weft stripes and 1/1 in warp stripes.

4.4.3 Width of woven fabric in loom at the reed shall be 127 cm.

4.4.4 The waving pattern shall be as given below:

Type DW	*Type TV*
62 threads spun secondry acetate	62 threads spun triacetate
48 threads bleached cotton	48 threads bleached cotton
56 threads spun polyamide	56 threads spun polyamide
48 threads spun polyester	48 threads spun polyester
44 threads spun acrylic	44 threads spun acrylic
60 threads worsted wool	60 threads worsted wool
16 threads spun polyester	16 threads spun polyester

4.5 Preparation

It is recommended that the woven fabric be washed in a jig as follows:

> Set the bath at 70°C with a non-ionic detergent (ethylene oxide condensate) and sodium tetraphosphate. Run two ends. Rinse two ends in cold running water and then rinse two ends at 50°C. Dry at 93°C and frame to 114 cm to 116 cm.

Table 2 Materials for the Weft Yarn

(*Clause* 4.3)

Properties (1)	Secondry Acetate (2)	Bleached Cotton (3)	Polyamide (4)	Polyester (5)	Acrylic (6)	Wool (7)	Triacetate (8)	Viscose Method of Test (9)
Staple Fibre								
Lustre or Grade	Bright	'Strict low Middling' to 'bright'	Semi-dull	Semi-dull	Semi-dull	Australian 64s quality	Bright	Dull
Tex per filament	0.333	— [1]	0.333	0.17	0.28	— [2]	0.333	0.17
Length, mm	50.8	27 to 25.7	38.0	38.0	38.0	82.5 ± 27	50.8	40.0
Yarn								
Linear density	30 tex × 2 ply	30 tex × 2 ply	30 tex × 2ply	30 tex × 2 ply	30 tex × 2 ply	30 tex × 2 ply	30 tex × 2 ply	30 tex × 2 ply
Spin twist, Turn/m 640 Z	640Z	570Z	670Z	640Z	640Z	450Z	640Z	510Z
Doubling twist, Turns/m	400S	590S	400S	400S	480S	130S	400S	400S
Whiteness[3]								
x	0.320 ± 0.003	0.318 ± 0.003	0.320 ± 0.003	0.318 ± 0.003	0.318 ± 0.003	0.338 ± 0.003	0.320 ± 0.003	0.328 ± 0.003
y	0.338 ± 0.003	0.335 ± 0.003	0.335 ± 0.003	0.336 ± 0.003	0.335 ± 0.003	0.338 ± 0.003	0.338 ± 0.003	0.345 ± 0.003
Y	80.0 ± 2.0	86.0 ± 2.0	86.0 ± 2.0	80.0 ± 2.0	82.0 ± 2.0	65.0 ± 2.0	80.0 ± 2.0	82.0 ± 2.0
W_{10}	63 ± 5	76 ± 5	71 ± 5	68 ± 5	72 ± 5	— [4]	63 ± 5	47 ± 5

[1] Micronaire : 4.4 average.

[2] Diameter : 22.22 µm.

[3] D_{65}, 10° observer, calculations in accordance with Annex C.

[4] The whiteness value for this fibre will be included latter.

ANNEX A

(*Clause* 4.1)

SPECIFICATION FOR SINGLE FIBRE ADJACENT FABRICS

A-1 SPECIFICATION FOR WOOL ADJACENT FABRIC

The fabric shall have the following properties:

Mass per unit area: (125 ± 5) g/m^2 when determined in accordance with IS 1964.

Colour specification: the CIE chromaticity coordinates for CIE standard illuminant D_{65} and CIE 1964 supplementary standard colorimetric observer (10° observer) are determined in accordance with IS 15098.

$x_{10} = 0.337 \pm 0.002$

$y_{10} = 0.356 \pm 0.002$

With the luminance factor

$Y_{10} = 72 \pm 2$

The yellowness (G) of the fabric shall be $G = 25 \pm 2$ when determined by the formula:

$$G = \frac{1.301X_{10} - 1.149\,Z_{10}}{Y_{10}} \times 100$$

*p*H of the aqueous extract shall be 7.5 ± 0.5 when determined by the method described in IS 1390.

The mass fraction of residual dichloromethane soluble matter shall be (0.5 ± 0.1) percent when determined by the method prescribed in Annex D. The solubility in alkali shall not exceed a mass fraction of 18 percent determined by the method described in IS 3429.

A-2 SPECIFICATION FOR COTTON AND VISCOSE ADJACENT FABRIC COTTON

The fabric shall have the following properties:

Mass per unit area: (115 ± 5) g/m^2 when determined in accordance with IS 1964.

Whiteness value: $y_{10} = 80 \pm 2$

$w_{10} = 73 \pm 2$

$T_{10} = -1 \pm 1$ (that is – 2 to 0)

Measurements shall be made with specular included in accordance with IS 15098, excluding 0/45 (45/0). Luminance (Y_{10}), Whiteness (W_{10}) and Tint (T_{10}) values shall be calculated using CIE standard illuminant D_{65} and CIE 1964 supplementary standard colorimetric observer (10° observer) in accordance with Annex C .

*p*H of the aqueous extract shall be 7.0 ± 0.5 when determined by the method described in IS 1390.

A-2.1 VISCOSE

The fabric shall have the following properties:

Mass per unit area: (140 ± 5) g/m^2 when determined in accordance with IS 1964.

Whiteness value: $y_{10} = 85 \pm 3$

$w_{10} = 58 \pm 4$

$T_{10} = -1 \pm 1$ (that is – 2 to 0)

Measurements shall be made with specular included in accordance with IS 15098, excluding 0/45 (45/0). Luminance (Y_{10}), Whiteness (W_{10}) and Tint (T_{10}) values shall be calculated using CIE standard illuminant D_{65} and CIE 1964 supplementary standard colorimetric observer (10° observer) in accordance with Annex C.

*p*H of the aqueous extract shall be 7.0 ± 0.5 when determined by the method described in IS 1390.

A-3 SPECIFICATION FOR POLYAMIDE ADJACENT FABRIC

The fabric shall have the following properties:

Mass per unit area: (130 ± 5) g/m^2 when determined in accordance with IS 1964.

Whiteness value: $y_{10} = 86 \pm 2$

$w_{10} = 65 \pm 2$

$T_{10} = -1 \pm 1$ (that is – 2 to 0)

Measurements shall be made with specular included in accordance with IS 15098, excluding 0/45 (45/0). Luminance (Y_{10}), Whiteness (W_{10}) and Tint (T_{10}) values shall be calculated using CIE standard illuminant D_{65} and CIE 1964 supplementary standard colorimetric observer (10° observer) in accordance with Annex C.

*p*H of the aqueous extract shall be 7.5 ± 0.5 when determined by the method described in IS 1390.

A-4 SPECIFICATION FOR POLYESTER ADJACENT FABRIC

The fabric shall have the following properties:

Mass per unit area: (130 ± 5) g/m^2 when determined in accordance with IS 1964.

Whiteness value: $y_{10} = 86 \pm 2$

$w_{10} = 70 \pm 2$

$T_{10} = 0 \pm 1$ (that is – 1 to 1)

Measurements shall be made with specular included in accordance with IS 15098, excluding 0/45 (45/0). Luminance (Y_{10}), Whiteness (W_{10}) and Tint (T_{10}) values shall be calculated using CIE standard illuminant D_{65} and CIE 1964 supplementary standard colorimetric observer (10° observer) in accordance with Annex C.

*p*H of the aqueous extract shall be 7.0 ± 0.5 when determined by the method described in IS 1390.

A-5 SPECIFICATION FOR ACRYLIC ADJACENT FABRIC

The fabric shall have the following properties:

Mass per unit area: (135 + 5) g/m2 when determined in accordance with IS 1964.

Whiteness value: $y_{10} = 86 \pm 2$

$w_{10} = 67 \pm 2$

$T_{10} = 1 \pm 1$ (that is 0 to 2)

Measurements shall be made with specular included in accordance with IS 15098, excluding 0/45 (45/0). Luminance (Y_{10}), Whiteness (W_{10}) and Tint (T_{10}) values shall be calculated using CIE standard illuminant D_{65} and CIE 1964 supplementary standard colorimetric observer (10° observer) in accordance with Annex C.

*p*H of the aqueous extract shall be 7.0 ± 0.5 when determined by the method described in IS 1390.

A-6 SPECIFICATION FOR SILK ADJACENT FABRIC

The fabric shall have the following properties:

Mass per unit area: (60 ± 3) g/m^2 when determined in accordance with IS 1964.

Whiteness value: $y_{10} = 91 \pm 2$

$w_{10} = 79 \pm 3$

$T_{10} = -1 \pm 1$ (that is – 2 to 10)

Measurements shall be made using the instrument geometry d/0, specular included in accordance with IS 15098. Luminance (Y_{10}), Whiteness (W_{10}) and Tint (T_{10}) values shall be calculated using CIE standard illuminant D_{65} and CIE 1964 supplementary standard colorimetric observer (10° observer) in accordance with Annex C.

*p*H of the aqueous extract shall be 7.8 ± 0.5 when determined by the method described in IS 1390.

The residual matter, after extraction with diethyl ether, shall not exceed 0.5 percent when tested in accordance with IS 4390. The alkali solubility shall not exceed 19 percent (*m*/*m*) when determined by the method described in IS 3429.

A-7 SPECIFICATION FOR SECONDRY ACETATE ADJACENT FABRIC

The fabric shall have the following properties:

Mass per unit area: (160 ± 5)g/m^2 when determined in accordance with IS 1964.

Whiteness value: $y_{10} = 86 \pm 2$

$w_{10} = 69 \pm 2$

$T_{10} = -1 \pm 1$ (that is – 2 to 0)

Measurements shall be made with specular included in accordance with IS 15098, excluding 0/45 (45/0). Illuminance (Y_{10}), Whiteness (W_{10}) and Tint (T_{10}) values shall be calculated using CIE standard illuminant D_{65} and CIE 1964 supplementary standard colorimetric observer (10° observer) in accordance with Annex C.

*p*H of the aqueous extract shall be 7.5 ± 0.5 when determined by the method described in IS 1390.

ANNEX B

(*Clause* 4.1)

METHOD FOR ESTABLISHING THE CONSISTENCY IN STAINING BETWEEN DIFFERENT PRODUCTION BATCHES OF ADJACENT FABRIC

B-1 SCOPE

This method specifies a method of quality control for establishing the consistency in staining between different batches of adjacent fabric.

B-2 PRINCIPLE

Comparative staining tests are conducted on a sample of a reference batch and a sample of the new batch of the fabric. The staining of each of the adjacent fabrics is then compared with the grey scale for assessing change in colour.

B-3 APPARATUS AND REAGENTS

B-3.1 Apparatus and Reagents — as specified in IS 3361.

B-3.2 Samples of Undyed Reference Adjacent Fabric and Adjacent Fabric Under Test — each measuring 40 mm × 40 mm.

B-3.3 For staining polyamide, wool and silk: Irgalan Orange RL-KWL 250 percent (CI Acid Orange 86). For staining cotton and viscose: Solophenyl Blue GL 230 percent (CI Direct Blue 71). For staining diacetate, triacetate, polyamide and polyester: Terasil Yellow 2GW 200 percent (CI Disperse Yellow 54). For staining polyester, diacetate, triacetate and polyamide : Terasil Navy Blue BGLN (CI Disperse Blue 130).

B-4 PROCEDURE

B-4.1 Place the sample of undyed reference fabric and the sample of undyed adjacent fabric under test (*see* **B-3.2**) in separate containers and add to each the necessary amount of soap solution (*see* **B-3.1**) and appropriate dye solution (*see* Note under **B-6**).

B-4.2 Treat each fabric at 50 ± 2°C for 45 minutes.

B-4.3 Remove each fabric, rinse twice in cold grade water (*see* **B-3.1**) and then in for 10 minutes, then squeeze. Open out each fabric and dry by hanging in air at a temperature not exceeding 60°C.

B-4.4 Assess the staining of the reference adjacent fabric using the grey scale for assessing (*see* **B-3.1**) to ensure that the degree of staining is 3-4.

B-4.5 Compare the staining of the reference adjacent fabric with that of the adjacent fabric under test using the grey scale for assessing change in colour (*see* **B-3.1**).

B-5 ASSESSMENT OF RESULTS

The adjacent fabric under test is acceptable for its staining properties when the colour difference between the staining of the reference and that of the fabric under test is not greater than 4-5 as measured by the grey scale for assessing change in colour (*see* IS 758).

B-6 TEST REPORT

Report the staining of the adjacent fabric under test (*see* IS 759) (*see* **B-5**).

NOTE — The amount of dye used shall give a staining on the reference adjacent fabric of 3-4 whilst ensuring that there is dye left in the test liquor. The following concentrations of the dye are given as a guide:

Irgalan Orange RL-KLW (250 percent) : 0.025 g/l

Solodhenyl Blue GL (230 percent) : 0.001 5 g/l

Terasil Yellow 2 GW (200 percent) : 0.002 g/l

Terasil Navy Green BGLN (100 percent) : 0.100 g/l

The test shall be carried out separately with each dye.

ANNEX C

(*Table* 2 and *Clause* A-2)

METHOD OF INSTRUMENTAL ASSESSMENT OF WHITENESS

C-1 PRINCIPLE

The chromaticity coordinates x_{10}, y_{10}, and the Y_{10} tristimulus values are calculated from the spectral radiance factors of the specimen and converted into a whiteness value. If these cannot be calculated, the x, y, Y values may be used instead. The redness/greenness tint factor may also be determined.

C-2 APPARATUS

Spectrophotometer — that irradiates the specimen with light resembling standard Illuminant D_{65}.

C-3 TEST SPECIMEN

The specimen shall consist of a number of layers sufficient to ensure that the addition of another layer does not alter the spectral radiance factors.

C-4 PROCEDURE

C-4.1 Measure the spectral radiance factors of the test specimen with a spectrophotometer (*see* **C-2**).

C-4.2 Calculate the x_{10}, y_{10} and Y_{10} values under illuminant D_{65} using the colour matching functions.

C-4.3 Calculate the whiteness value W_{10} from the equation:

$$W_{10} = Y_{10} + 800 (0.3138 - x_{10}) + 1\,700 (0.3310 - y_{10})$$

If required, calculate the tint factor $T_{W,\,10}$ from the equation:

$$T_{W,\,10} = 900 (0.313\,8 - x_{10}) - 650 (0.331\,0 - y_{10})$$

If x, y, Y values have been obtained, the corresponding equations are:

$$W = Y + 800 (0.312\,7 - x) + 1700 (0.329\,0 - y)$$

$$T_w = 1000 (0.312\,7 - x) + 650 (0.329\,0 - y)$$

NOTES

1 The perfect diffuser has whiteness values, W_{10} and W of 10000. The higher the whiteness value, the greater the indicated whiteness.

2 The tint formulae are based on the empirical result that lines of equal tint run approximately parallel to the lines of dominant wavelength 466 nm in the x10, y_{10} and xy chromaticity diagrams. The perfect diffuser has tint factors, $T_{W,\,10}$ or T_W of zero. This corresponds to a dominant wavelength in the blue region of the spectrum at 466 nm. Positive values of $T_{W,\,10}$ or T_W indicate greenness; negative value, redness.

3 The test method provides relative, but not absolute, evaluations of whiteness and is restricted to specimens which are measured on the same instrument or instruments known to give values which are acceptably close. The application of the formulae is restricted to samples whose values of W_{10} or W and $T_{W,\,10}$ or T_W lie within the following limits:

W_{10} or W graeter than 40 and less than $5Y_{10} - 280$ or $5Y$-280;

$Tw,_{10}$ or T_w greater than – 3 and less than + 3.

ANNEX D

(*Clause* A-1)

DETERMINATION OF DICHLOROMETHANE — SOLUBLE MATTER IN WOOL

D-1 PRINCIPLE

A known amount of wool is extracted in a Soxhlet apparatus with dichloromethane and then the soluble matter is calculated based on the difference in mass of original specimen and the untreated specimen.

D-2 REAGENTS

D-2.1 Dichloromethane (Methylene Chloride), boiling range 39 to 41°C. When 100-ml of the solvent is evaporated, the residue shall not exceed 1 mg.

NOTE — Dichloromethane is toxic, therefore, the room in which extractions are made shall be adequately ventilated.

D-2.2 Acetone, analytical reagent quality.

D-3 APPARATUS

D-3.1 Soxhlet Extraction Apparatus, assembled with ground glass joints and protected against the entry of moisture. The extractor (Barrel) of the Soxhlet shall conveniently have a capacity of about 200 to 300-ml and the flask 250-ml.

D-3.2 Water-Bath, or other suitable means of low temperature heating.

D-3.3 Balance, with an accuracy of 0.05 g, preferably with large scale-pan.

D-3.4 Analytical Balance, accurate to 0.000 1 g.

D-3.5 Desiccator

D-3.6 Drying Oven, capable of being controlled at a temperature of 105 ± 3°C.

D-3.7 Conical Flask, 100-ml capacity.

D-3.8 Funnel

D-3.9 Distillation Unit

D-3.10 Fat-Free Filter Papers

NOTE — Whatman filter paper No. 2 is suitable.

D-4 CONDITIONING AND TESTING ATMOSPHERE

All tests shall be carried out in standard atmospheres for testing textiles that is 27 ± 2°C temperature and (65 ± 2) percent relative humidity.

D-5 SAMPLING

The laboratory sample shall be representative of the bulk of the material and shall be sufficient to provide two test specimens each of mass approximately 20 grams.

D-6 PROCEDURE

D-6.1 Condition the laboratory sample and bring it to constant mass by exposing it for not less than 24 h in the standard atmosphere for testing (*see* **D-4**).

D-6.2 In the standard atmosphere for testing, prepare two test specimens each of mass 20 ± 0.05 g. For each duplicate test, introduce the specimen into the Soxhlet barrel in such a way that the extract will not carry wool fibres into the siphon tube and that the level of the top of the test specimen is below that of the end of the siphon tube. A particle-free extract may be secured by one of the following methods:

a) Insert a glass wool plug at a bottom of the Soxhlet barrel, effectively covering the exit tube.

b) Pack the test specimen into a Soxhlet thimble covering with a loose plug of dichloromethane-extracted cotton wool.

c) Enclose the test specimen in a lightweight woven or knitted dichloromethane-extracted fabric.

Check that the extraction flask and filter are free from fatty. If a water-bath is used, heat it to approximately 45°C. Assemble the flask and Soxhlet barrel. Pour into the barrel sufficient dichloromethane (*see* **D-2.1**) to cause first siphoning, together with a small excess. Complete the assembly of condenser, Soxhlet barrel, flask and heating device. Check that all joints are tight. Adjust the heating so that satisfactory siphoning occurs at the rate of not less than 6 cycles per hour. All 20 to 24 siphoning, adding additional solvent, if desired. Reject any test in which the siphoning does not function correctly.

D-6.3 Filter the contents of the extraction flask, previously concentrated (if necessary) to approximately 25-ml, through filter paper (*see* **D-3.10**) into a tared 100-ml conical flask (*see* **D-3.7**) which is heated on a boiling water-bath, but not in direct contact with the water. A sintered glass Bucher filter may be used in lieu of filter paper. Wash the extraction flask and filter with three separate 10 ml portions of dichloromethane. Before the last washing, cut off the edge of the paper and place it at the bottom of the cone to facilitate washing matter by washing with a further 10-ml portion of dichloromethane, which is collected separately and then evaporated on a watch glass. If any fatty residue appears, continue washing until the extraction flask and filter are free from fatty matter.

D-6.4 When the distillation of the dichloro methane is completed, detach the conical flask and heat on the water-bath for a further 5 min. If droplets of water are present in the flask, add 2 to 5-ml of acetone (*see* **D-2.2**) and heat on the water-bath, repeating the process if necessary until no water is visible.

D-6.5 Heat the conical flask for 30 min in the drying over (*see* **D-3.6**) at 105 ± 3°C or in a vacuum oven and then introduce, for a few seconds, a tube connected to a pump so as to suck out vapour from the flask.

D-6.6 Finally, heat for a further 5 min in the oven and place in the dessicator (*see* **D-3.5**). Determine the mass of the flask and contents and hence the mass of the dichloromethane-soluble extract.

D-6.7 If the result is to be expressed on the dry mass of the test specimen, determine the dry mass of the extracted test specimen by heating to constant mass at a temperature of 105 ± 3°C, preferably in ventilated enclosure.

D-7 EXPRESSION OF RESULTS

D-7.1 The dichloromethane-soluble extract is given, as a percentage of the conditioned mass of the de-greased specimen, by the formula:

$$\frac{100m_1}{20-m_1}$$

Where m_1 is the mass, in grams, of the dichloromethane-soluble extract.

D-7.2 The dichloromethane-soluble extract is given, as a percentage of the dry mass of the de-greased specimen, by the following formula:

$$\frac{100m_1}{m_2}$$

where

m_1 = mass, in grams, of the dichloromethane-soluble extract; and

m_2 = dry mass, in gram, of the extracted test specimen.

ANNEX E

(Foreword)

COMMITTEE COMPOSITION

Chemical Methods of Test Sectional Committee, TX 05

Organization	*Representative(s)*
Ahmedabad Textile Industry's Research Association, Ahmedabad	Dr T. S. Sarma (***Chairman***) Shri A. B. Shah (*Alternate*)
Arvind Mills Limited, Ahmedabad	Dr J. J. Shroff
Binny Limited, Chennai	Shri J. M. David
Bombay Dyeing and Manufacturing Co Ltd, Mumbai	Shri N. Satish Rao Shri A. S. Gore (*Alternate*)
Bombay Millowners' Association, Mumbai	Shri S. V. Soudagar Shri Mahesh Sharma (*Alternate*)
Bombay Textile Research Association, Mumbai	Shri A. V. Afini Shri C. J. Kolgaonkar (*Alternate*)
Central Institute for Research on Cotton Technology, Mumbai	Dr (Mrs) Vatsalya Iyer Dr R. H. Balasubramanya (*Alternate*)
Directorate General of Supplies and Disposals, New Delhi	Shri A. K. Sehgal Shri Samoron Roy (*Alternate*)
Indian Jute Industries' Research Association, Kolkata	Shri N. C. Som
Jayashree Textiles, Rishra (West Bengal)	Dr K. K. Goswami Shri Admey Nair (*Alternate*)
JCT Ltd, Phagwara	Shri B. L. Kak
Mafatlal Industries Ltd, Navsari	Dr U. V. Vyas Shri J. P. Deshpande (*Alternate*)
Man-Made Textile Research Association, Surat	Dr Sandeep R. Naik Shri M. G. Patel (*Alternate*)
Ministry of Defence (DGQA), New Delhi	Shri P. P. Naidu Shri Rama Yadav (*Alternate*)
Ministry of Defence (R&D), New Delhi	Shri Nishkam Kasturia Shri S. C. Jain (*Alternate*)
National Textile Corporation Limited, New Delhi	Shri B. R. Verma Shri P. K. Home (*Alternate*)
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